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ABSTRACT

This document is the Grade 12 diploma examination in mathematics at Level 30 from the Office of the Ministry of Education in Alberta. The two-and-a-half hour test is a closed-book examination consisting of 40 multiple choice and 9 numerical response questions of equal value worth 70% of the examination, and three written response questions worth 30% of the examination. (DDR)

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ED 411 160

June 1997

Mathematics 30

Grade 12 Diploma Examination

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June 1997

Mathematics 30

Grade 12 Diploma Examination

Description

Time: 2.5 h. You may take an additional 0.5 h to complete the examination.

This is a **closed-book** examination consisting of

- 40 multiple-choice questions and 9 numerical-response questions, of equal value, worth 70% of the examination
- 3 written-response questions, of equal value, worth 30% of the examination

A tear-out formula sheet and a z-score page are included in this booklet.

All graphs on this examination are computer-generated.

Instructions

- Consider all numbers used in the questions to be **exact** numbers and not the result of a measurement.
- Fill in the information required on the answer sheet and the examination booklet as directed by the presiding examiner.
- You are expected to provide your own scientific calculator.
- Carefully read the instructions for each part before proceeding.
- The presiding examiner will collect your answer sheet and examination booklet and send them to Alberta Education.
- Do not fold the answer sheet.

Note: *The perforated pages at the back of this booklet may be torn out and used for your rough work.* ***No marks*** *will be given for work done on the tear-out pages.*

Multiple Choice

- Read each question carefully and decide which of the choices completes the statement or answers the question.
- Locate that question number on the separate answer sheet provided and fill in the circle that corresponds to your choice.

Example

This diploma examination is for the subject of

A. biology
B. physics
C. chemistry
D. mathematics

Answer Sheet

Ⓐ Ⓑ Ⓒ ●

- **Use an HB pencil only.**
- If you wish to change an answer, erase **all** traces of your first answer.

Numerical Response

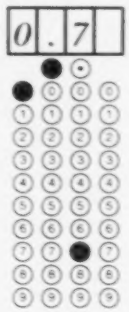
- Read each question carefully.
- Record your answer on the answer sheet provided by writing it in the boxes and then filling in the corresponding circles.
- **Enter the first digit of your answer in the left-hand box and leave any unused boxes blank.**
- Use an HB pencil only.
- If you wish to change an answer, erase **all** traces of your first answer.

Sample Questions and Solutions

Correct to the nearest tenth of a radian, 40° is equal to _____ rad.

$40^\circ = 0.6981317008\ldots$ rad

Record 0.7 on the answer sheet →



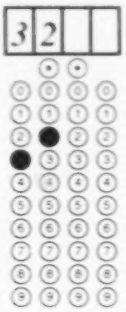
For the arithmetic series $-8 + (-5) + (-2) + \ldots + (85)$, the number of terms is _____.

$85 = -8 + (n - 1)(3)$

$93 = 3n - 3$

$n = 32$

Record 32 on the answer sheet →

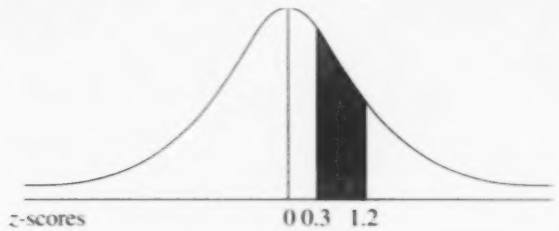


Written Response

- Read each question carefully.
- Write your answers in the examination booklet as neatly as possible.
- For full marks, your answers **must show all** pertinent explanations, calculations, and formulas.
- Your answers **should be** presented in a well-organized manner using complete sentences for a written response, and correct units for a numerical response.

Use the following information to answer the next question.

A standard normal distribution is shown below. The shaded region is determined by $0.3 \leq z \leq 1.2$.



1. The area of the shaded region is

A. 0.1151
B. 0.2670
C. 0.3821
D. 0.4713

---

2. The results from a Biology examination are normally distributed. A student is told that his mark on the exam corresponds to a z-score of -2.0 but is not told the mean, standard deviation, or actual mark. Which conclusion is **always** true in this situation?

A. The student scored above 50%.
B. The student scored below 50%.
C. The student scored above the mean.
D. The student scored below the mean.

3. A manufacturer has determined that the length of time that fully charged rechargeable batteries will be functional is normally distributed with a standard deviation of 2.5 h. If one of these batteries is selected randomly, then the probability that it will be functional more than 11.0 h is 0.123. The mean length of time that these batteries remain functional is

A. 8.1 h

B. 7.6 h

C. 7.3 h

D. 6.8 h

Numerical Response

1. The results of a test are normally distributed with a mean of 70. If a student's score of 61 is 1.2 standard deviations below the mean, then the standard deviation for this test, correct to the nearest tenth, is _____ .

(Record your answer on the answer sheet.)

Use the following information to answer the next question.

A student prepared the following table to graph a third-degree polynomial function, P.

x	-4	-3	-2	-1	0	1	2	3	4
$P(x)$	-80	-24	0	4	0	0	16	60	144

4. The equation of the polynomial function, P, is

A. $P(x) = 4x(x + 2)(x - 1)$

B. $P(x) = 4x(x - 2)(x + 1)$

C. $P(x) = 2x(x + 2)(x - 1)$

D. $P(x) = 2x(x - 2)(x + 1)$

8

5. When $P(x) = 2x^3 - 3x^2 - 4x + M$ is divided by $x - 3$, the remainder is R. An equation defining the relationship between M and R is

A. $R = M - 15$

B. $R = M - 69$

C. $R = M + 15$

D. $R = M + 69$

6. A student graphed the equation of a polynomial function, $y = P(x)$, to help determine the solution to the equation $P(x) = 0$. Which of the following provides the solution to $P(x) = 0$?

A. The x-intercepts of the graph of $y = P(x)$

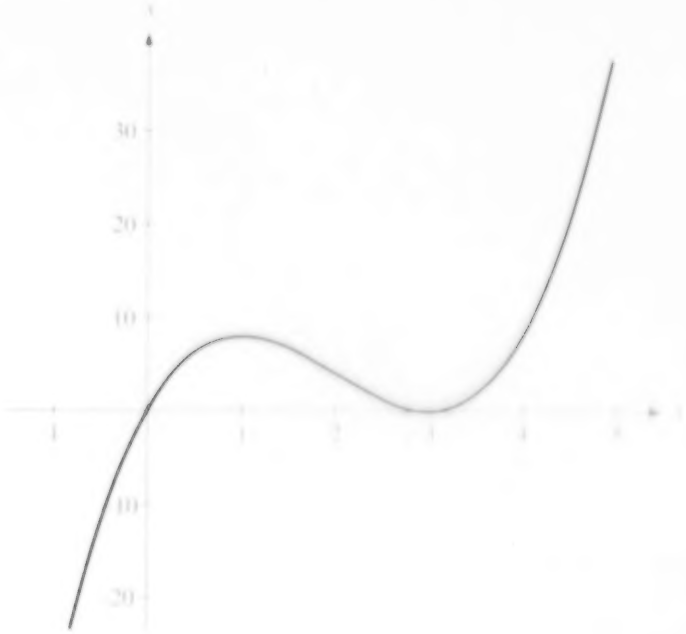
B. The y-intercept of the graph of $y = P(x)$

C. The point(s) of intersection of $x = 0$ and the graph of $y = P(x)$

D. The point(s) of intersection of $y = 0$ and $P(0)$

Use the following information to answer the next question.

A given polynomial function is $P(x) = 2x(x-3)^2$. The graph of $y = P(x)$ is shown below.



7. For $x \geq 4$, the range of $P(x)$ is

A. $y \geq 3$

B. $y \geq 8$

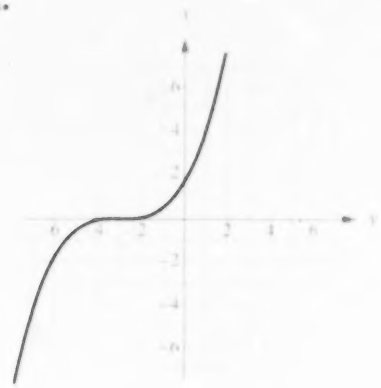
C. $0 \leq y \leq 3$

D. $y \in \Re$

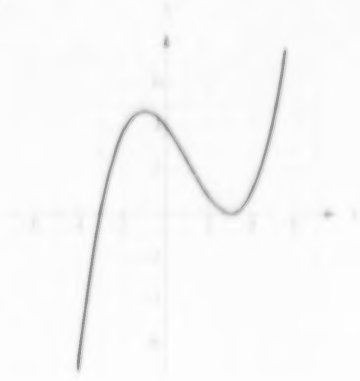
10

8. When a third-degree polynomial function is divided by $x - 1$, the remainder is -4. Which of the following could be the graph of one such function?

A.

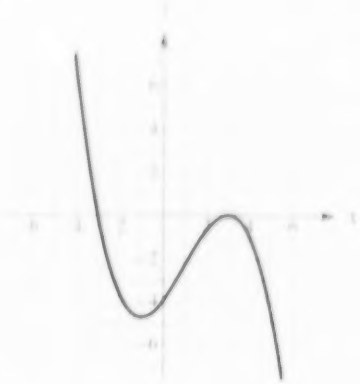


B.



C.

D.



9. An integral polynomial function is defined by $P(x) = x^3 - ax^2 - 2x + 2a$, $a \neq 0$. Which of the following is a factor of $P(x)$ for any value of a?

A. $x - a$

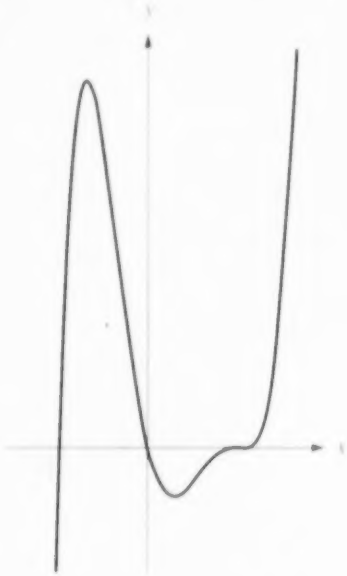
B. $x + \sqrt{a}$

C. $x - \sqrt{a}$

D. $x + a$

Use the following information to answer the next question.

The partial graph of a polynomial function is shown below. All of the x-intercepts are shown.



10. The minimum degree of this polynomial function is

A. 3
B. 4
C. 5
D. 6

Numerical Response

2. If 2 is a positive zero of the polynomial function $P(x) = x^3 - 11x + 14$, then correct to the nearest tenth, another positive zero of $P(x)$ is _____ .

(Record your answer on the answer sheet.)

12

11. An arc of a circle subtends a central angle θ. If the length of the arc is 6 units and the radius is 4 units, then the measure of θ, correct to the nearest tenth of a degree, is

A. 38.2°

B. 82.8°

C. 85.9°

D. 97.2°

12. The expression $\sin\theta \sec\theta \csc\theta \cot\theta$, $\theta \neq \frac{n\pi}{2}$, $n \in I$, is equal to

A. $\cos\theta$

B. $\sec\theta$

C. $\tan\theta$

D. $\csc\theta$

13. A comparison of points on the graphs of $y = p(\theta) = a\cos\left(\theta - \frac{\pi}{2}\right)$ and $y = q(\theta) = k\cos(\theta)$, $a \neq k$, would show that

A. the y-intercept of $p(\theta)$ is $\frac{\pi}{2}$ units lower than the y-intercept of $q(\theta)$

B. the y-intercept of $p(\theta)$ is a, whereas the y-intercept of $q(\theta)$ is k

C. the θ-intercepts of $p(\theta)$ and $q(\theta)$ are the same

D. the θ-intercepts of $p(\theta)$ are $\frac{\pi}{2}$ units to the right of the θ-intercepts of $q(\theta)$

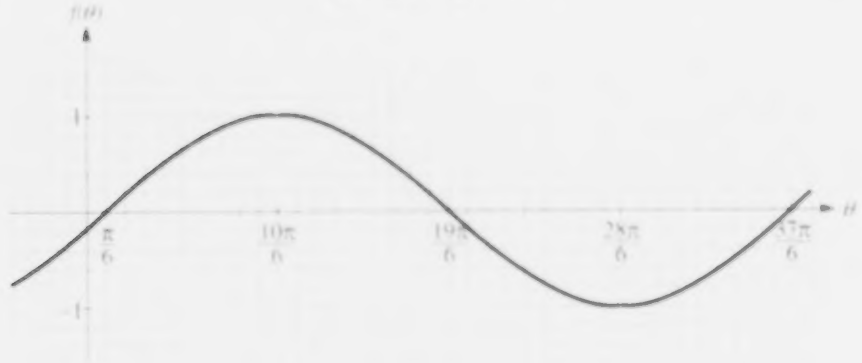
Use the following information to answer the next question.

A student graphed a function of the form of

$$f(\theta) = a\sin[b(\theta + c)], \text{ where } a > 0 \text{ and } b > 0,$$

on a computer. The computer display, where θ is measured in radians, is shown below. The graph crosses the θ-axis at

$$\frac{\pi}{6}, \frac{19\pi}{6}, \frac{37\pi}{6}, \ldots$$



14. The value of b is

A. $\frac{1}{6}$

B. $\frac{1}{3}$

C. 3

D. 6

15. Correct to the nearest tenth of a radian, the smallest positive x-intercept of the graph of $f(x) = (\cos x - 2)(3\cos x + 1)$, $0 \le x < 2\pi$, is

A. 2.1 rad

B. 1.9 rad

C. 1.2 rad

D. 1.0 rad

16. If $f(\theta) = a\cos(b\theta)$, where $a > 0$ and $b > 0$, then the range of f is

A. $-a \le f(\theta) \le a$

B. $-1 \le f(\theta) \le 1$

C. $-b \le f(\theta) \le b$

D. $a - 1 \le f(\theta) \le a + 1$

Numerical Response

3. If $\dfrac{1}{\tan^2\theta + 1} = 0.64$ and θ is acute, then the value of θ, correct to the nearest tenth of a degree, is _____ °.

(Record your answer on the answer sheet.)

Numerical Response

4. If $\cos x = \cos 60° \cos 45° - \sin 60° \sin 45°$, then the value of x, $0° < x < 180°$, correct to the nearest degree, is _____ °.

(Record your answer on the answer sheet.)

17. If $\log_b(x+d)=f$, where $b>0$ and $(x+d)>0$, then x, in terms of b, d, and f, is

A. b^f-d

B. f^b-d

C. d^f-b

D. f^d-b

Use the following information to answer the next question.

Radioactive Decay

$N(t)=N_0\left(\frac{1}{2}\right)^{\frac{t}{h}}$, where $N(t)$ = the mass present at time t

N_0 = $N(0)$

t = time in days

h = half-life of the material in days

18. The half-life of Iodine-126 is 13 days. The length of time, to the nearest day, that it will take 10 g of Iodine-126 to decay to 0.1 g is

A. 130 days

B. 86 days

C. 79 days

D. 30 days

19. The expression $\log_5\left(\frac{25m^3}{n}\right)$, where $m>0$ and $n>0$, is equal to

A. $\frac{6\log_5(m)}{\log_5(n)}$

B. $6\log_5(m)-\log_5(n)$

C. $2+3\log_5(m)-\log_5(n)$

D. $25+3\log_5(m)-\log_5(n)$

20. The inverse, f^{-1}, of the function $f(x) = \log_5(x)$, $x > 0$, is

A. $f^{-1}(x) = 5^x$, $x \in \Re$

B. $f^{-1}(x) = x^5$, $x \in \Re$

C. $f^{-1}(x) = \log_x(5)$, $x > 0$

D. $f^{-1}(x) = \log_5\left(\frac{1}{x}\right)$, $x > 0$

21. The solution of the equation $4^x = 24$ is

A. $\log_{10} 6$

B. $4\log_{10} 24$

C. $\frac{\log_{10} 24}{\log_{10} 4}$

D. $\log_{10} 24 - \log_{10} 4$

22. The value of $\log_8(16) - \log_8(2) + \log_8(4)$ is

A. $\frac{3}{5}$

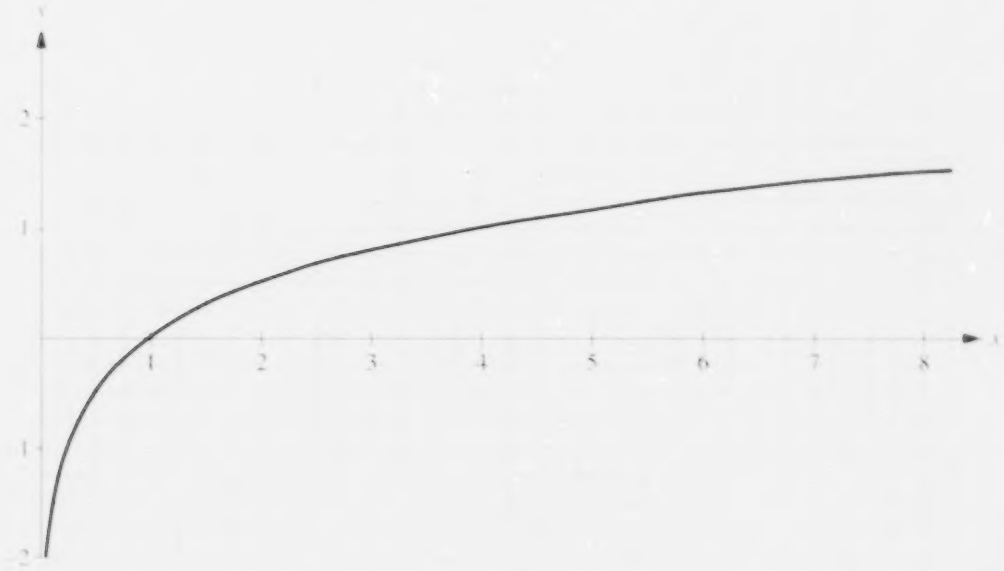
B. $\frac{5}{3}$

C. 2

D. 4

Use the following information to answer the next two questions.

A partial graph of $y = \log_a x$ passes through the point $\left(8, \frac{3}{2}\right)$, as shown below.



23. Which of the following statements is true for the given information?

A. The range of $y = \log_a x$ is $y \leq 2$.

B. The domain of $y = \log_a x$ is $x \in \Re$.

C. The graph of $y = \log_a x$ has no y-intercept.

D. The y-intercept of the graph of $y = \log_a x$ is -2.5.

Numerical Response

5. Correct to the nearest tenth, the value of a is _____ .

(Record your answer on the answer sheet.)

24. A plane cuts through one nappe of a right circular cone and is parallel to a generator. The intersection of the plane and the cone forms

A. a circle

B. an ellipse

C. a parabola

D. a hyperbola

25. For which of the following values of A will the equation $Ax^2 - 5y^2 + Dx + Ey + F = 0$ be a hyperbola?

A. $A = 5$

B. $A = -5$

C. $A = 0$

D. $A = -3$

26. The equation for a quadratic relation is $Ax^2 + Cy^2 + Dx + Ey + F = 0$.
If $A \times C < 0$, and if the conic is non-degenerate, then any point, P, on the locus must be such that

A. the distance from P to a fixed point is constant

B. the distances from P to a fixed point and to a fixed line are equal

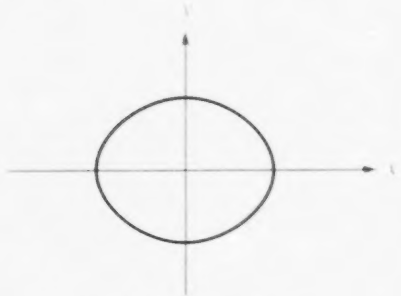
C. the sum of the distances from P to two foci is constant

D. the difference of the distances from P to two foci is constant

Use the following information to answer the next question.

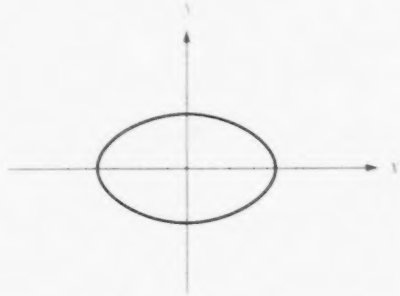
The graphs of four quadratic relations are all drawn to the same scale, as shown below.

I.



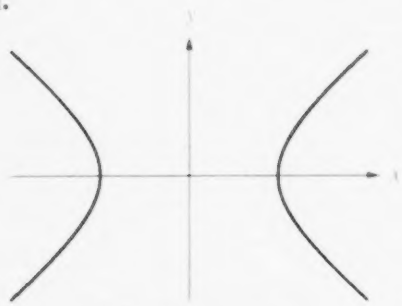
$16x^2 + 25y^2 - 400 = 0$

II.



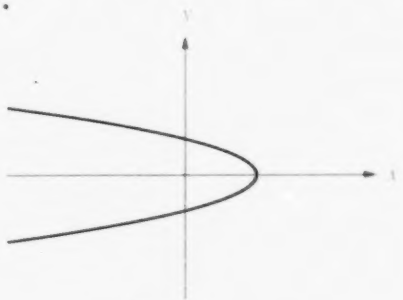
$9x^2 + 25y^2 - 225 = 0$

III.



$16x^2 - 25y^2 - 400 = 0$

IV.



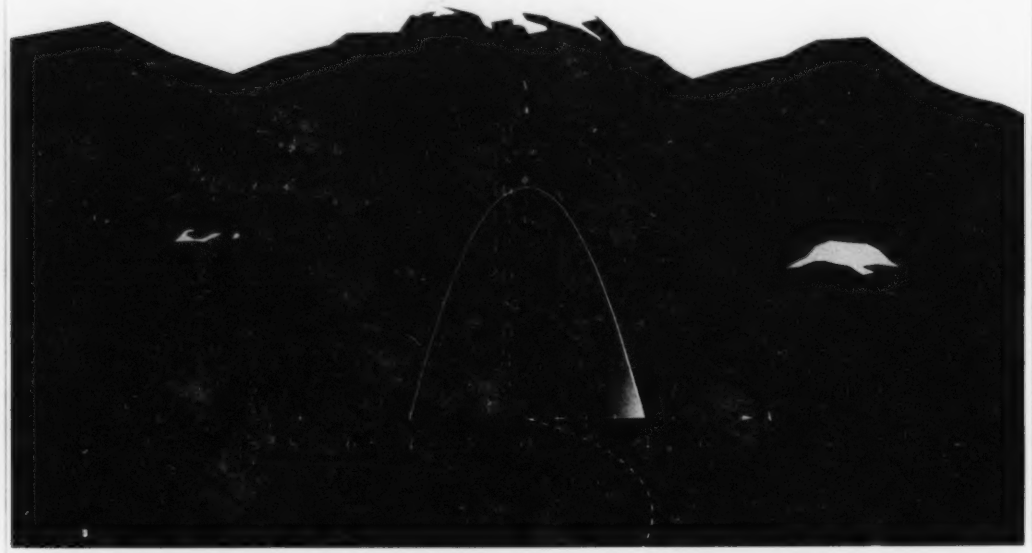
$y^2 + x - 4 = 0$

27. If the values of the eccentricities of these quadratic relations are calculated and put in ascending order, then the values of the eccentricities would correspond to the graphs labelled

A. I, II, III, IV
B. II, I, III, IV
C. I, II, IV, III
D. II, I, IV, III

Use the following information to answer the next question.

A parabolic highway tunnel sketched below has a cross section given by $x^2 + y - 16 = 0,\ y \geq 0,$ where x and y are measured in metres.



28. The maximum height of a 3 m-wide truck travelling through the tunnel in the **right-hand lane** cannot be greater than

A. 3.6 m
B. 3.8 m
C. 7.0 m
D. 13.8 m

29. The value of the eccentricity of a hyperbola is $\frac{5}{4}$, and the hyperbola passes through the point $P(3, 0)$. If the directrix is defined by $x = \frac{7}{5}$, then the corresponding focus is at

A. $\left(3\frac{1}{8}, 0\right)$

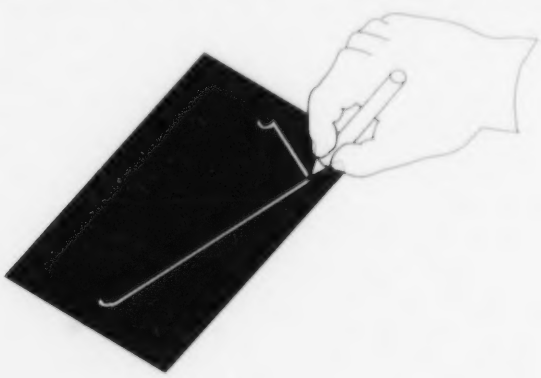
B. $(4, 0)$

C. $\left(4\frac{7}{25}, 0\right)$

D. $(5, 0)$

Use the following information to answer the next question.

A child's ladybug costume is made by cutting an ellipse out of a piece of cardboard, 24 cm × 30 cm. To draw the ellipse, a person tacks down the ends of a piece of string, pulls the string tight with the pencil, and traces out the ellipse by moving the pencil. When the string is pulled tight, the total length of the string from one tack to the other tack is 30 cm. The result is shown below.



Numerical Response

6. If the ellipse is drawn so that it just touches the mid-points of the edges of the cardboard, then the distance, to the nearest tenth, between the 2 tacks is _____ .

(Record your answer on the answer sheet.)

30. The sequence $\log(a^3)$, $\log(a^5)$, $\log(a^7)$, $a \neq 1$, is

A. an arithmetic sequence with a common difference of $2\log(a)$

B. an arithmetic sequence with a common difference of $\log(2a)$

C. a geometric sequence with a common ratio of $2\log(a)$

D. a geometric sequence with a common ratio of $\log(2a)$

31. When the terms of a series defined by $\sum_{k=3}^{100}\left[2(k-1)^2\right]$ are written in ascending order, the third term is

A. 8

B. 32

C. 50

D. 64

32. The **sum** of the first n terms of a sequence is defined by $S_n = n^2$, where $n \in N$. The first four terms of the **sequence** are

A. 1, 2, 3, 4

B. 1, 5, 14, 30

C. 1, 2, 4, 16

D. 1, 3, 5, 7

33. An outdoor theatre has 25 rows of seats, with 10 seats in the first row. Each row includes d seats more than the preceding row. If there are 1 150 seats altogether, then the number of seats in the 14th row is

A. 46

B. 49

C. 52

D. 55

34. In a geometric sequence, $t_2 = -6$ and $t_6 = -486$. If $t_3 > 0$, then the common ratio is

A. -3

B. $-\frac{1}{3}$

C. $\frac{1}{3}$

D. 3

35. If the sum of the first 5 terms of a geometric series is 410 and the common ratio is $-\frac{1}{4}$, then the first term is

A. 81.5

B. 512

C. 1 024

D. 104 960

Numerical Response

7. The first term of an arithmetic sequence is 5. If $t_8 + t_9 = 62.5$, then the common difference, correct to the nearest tenth, is _____ .

(Record your answer on the answer sheet.)

36. Each of 49 pieces of paper has one of the numbers 1 to 49 written on it. The same number does not appear on more than one piece of paper. These pieces of paper are then placed in a hat. The student draws 6 pieces of paper, at random, from the hat. Which of the following expresses the number of ways the student could draw only even numbers?

A. ${}_{24}P_6$

B. ${}_{49}P_6$

C. ${}_{49}C_6$

D. ${}_{24}C_6$

37. There is a set of 5 different promotional posters available to advertise new video movies. The placement of the posters is important to promoters because they have discovered that a poster near the checkout counter draws more attention than one on the window. If 2 posters are going to be displayed, one near the checkout counter and one on the window, then the number of different ways a promoter can display 2 posters is

A. 10

B. 20

C. 60

D. 120

38. A circuit breaker can be set in 2 positions, "on" or "off." How many different ways can 4 circuit breakers in a row on a panel be set if no two adjacent switches can be "on"?

A. 3

B. 5

C. 8

D. 16

39. The letters in the word **POSITIVE** are to be re-arranged. How many different arrangements are possible if all the vowels must be together?

A. $\frac{5!}{2!}$

B. $\frac{8!}{2!}$

C. $\frac{4! \times 4!}{2!}$

D. $\frac{5! \times 4!}{2!}$

40. A school cross-country running team consists of 4 students and must include at least 2 girls. If 7 boys and 5 girls are trying out for the team, then the maximum number of ways that the team can be chosen is

A. 495

B. 285

C. 210

D. 25

Numerical Response

8. The numerical coefficient, correct to the nearest whole number, of the term containing x^3 in the expansion of $(3x + 1)^6$ is _____ .

(Record your answer on the answer sheet.)

Numerical Response

9. If $\frac{n!}{(n-2)!} = 10\,100$, then the value of n, correct to the nearest whole number, is _____ .

(Record your answer on the answer sheet.)

The written-response questions follow on the next page.

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Use the following information to answer the next question.

Two different third-degree polynomial functions of the form $P(x) = k(x-m)^2(x-n)$, satisfy the following conditions:

- the graph of each function has x-intercepts, 1 and -3, and
- the graph of each function has a y-intercept of 6

Written Response — 10%

1. • Sketch the graph of each function on the axes provided.

Polynomial Function I

Polynomial Function II

28

For Department Use Only

- Determine the equation of **one** of these functions and clearly indicate which graph your equation describes. Write the equation in the form $P(x) = k(x - m)^2(x - n)$.

- Suppose a student determined correct values for m and n in the equation in the previous part of this question, but made a computational error resulting in an incorrect value for k. If the student graphed the function using this incorrect value for k, what differences, if any, would you predict between the values of the x-intercepts and y-intercept of this graph and the values of the x-intercepts and y-intercept of the correct graph of the function. Explain your predictions.

Written-response question 2 begins on the next page.

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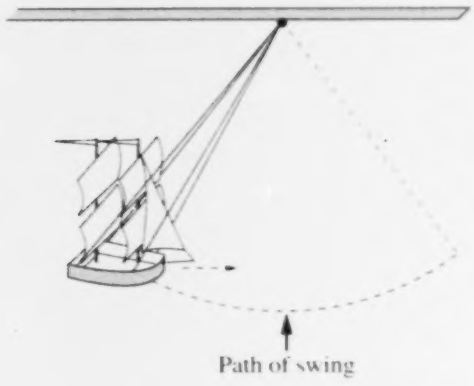
Use the following information to answer the next question.



Written Response — 10%

2. A new children's ride is modelled after a basic pendulum design involving a pirate ship swinging back and forth. The children board the ship at the top of the swing. A swing is completed when the ship's motion changes direction. On the first completed swing, the arc length travelled by the boat is 60 m. On each successive completed swing, the boat travels $\frac{49}{50}$ as far as on the previous swing. The ride finishes at the end of the first swing that is shorter than 35 m, and the children exit.

- How many swings are completed in a full ride?

30

- Correct to the nearest metre, what is the total distance travelled during the first 15 complete swings?

- On a busy day, the waiting times to board the pirate ship ride were recorded. The waiting times were found to be normally distributed with a mean of 35 minutes and standard deviation of 8 minutes. Determine the probability that a person in line has to wait longer than 45 minutes.

Written-response question 3 begins on the next page.

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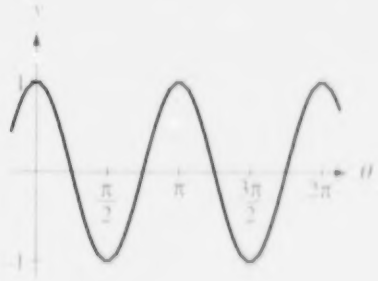
Use the following information to answer the next question.

The graph of $y = f(\theta) = \cos^4\theta - \sin^4\theta$ is shown below.



Written Response — 10%

3. This also appears to be the graph of $y = g(\theta) = \cos b\theta$ for some $b \in N$.

- Determine the value of b.

- How is the value of b related to the characteristics of the graph?

32

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- Prove that $\cos^4\theta - \sin^4\theta = \cos b\theta$, $b \in N$, for the value of b you determined in the first part of this question. Begin by factoring $\cos^4\theta - \sin^4\theta$. Show all your work. Hint: $\cos(2A) = \cos(A + A)$

You have now completed the examination.
If you have time, you may wish to check your answers.

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Mathematics 30 Formula Sheet

The following information may be useful in writing this examination.

- The roots of the quadratic equation $ax^2 + bx + c = 0$ are

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

- The distance between two points (x_1, y_1) and (x_2, y_2) is

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

Quadratic Relations

- $e = \dfrac{PF}{PD}$

Trigonometry

- arc length $a = r\theta$
- $\sin^2 A + \cos^2 A = 1$
- $1 + \tan^2 A = \sec^2 A$
- $1 + \cot^2 A = \csc^2 A$
- $\csc A = \dfrac{1}{\sin A}$
- $\sec A = \dfrac{1}{\cos A}$
- $\cot A = \dfrac{\cos A}{\sin A}$
- $\sin(A + B) = \sin A \cos B + \cos A \sin B$
- $\sin(A - B) = \sin A \cos B - \cos A \sin B$
- $\cos(A + B) = \cos A \cos B - \sin A \sin B$
- $\cos(A - B) = \cos A \cos B + \sin A \sin B$

Permutations and Combinations

- ${}_nP_r = \dfrac{n!}{(n-r)!}$
- ${}_nC_r = \dfrac{n!}{r!(n-r)!}$
- In the expansion of $(x + y)^n$, the general term is $t_{k+1} = {}_nC_k x^{n-k} y^k$

Sequences and Series

- $t_n = a + (n-1)d$
- $S_n = \dfrac{n[2a + (n-1)d]}{2}$
- $S_n = n\left(\dfrac{a + t_n}{2}\right)$
- $t_n = ar^{n-1}$
- $S_n = \dfrac{a(r^n - 1)}{r - 1}, r \neq 1$
- $S_n = \dfrac{rt_n - a}{r - 1}, r \neq 1$

Exponential and Logarithmic Functions

- $\log_a mn = \log_a m + \log_a n$
- $\log_a \dfrac{m}{n} = \log_a m - \log_a n$
- $\log_a m^n = n \log_a m$

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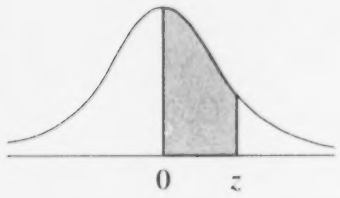
$$z = \frac{x - \mu}{\sigma}$$



Areas under the Standard Normal Curve

z	0	1	2	3	4	5	6	7	8	9
0.0	0.0000	0.0040	0.0080	0.0120	0.0160	0.0199	0.0239	0.0279	0.0319	0.0359
0.1	0.0398	0.0438	0.0478	0.0517	0.0557	0.0596	0.0636	0.0675	0.0714	0.0754
0.2	0.0793	0.0832	0.0871	0.0910	0.0948	0.0987	0.1026	0.1064	0.1103	0.1141
0.3	0.1179	0.1217	0.1255	0.1293	0.1331	0.1368	0.1406	0.1443	0.1480	0.1517
0.4	0.1554	0.1591	0.1628	0.1664	0.1700	0.1736	0.1772	0.1808	0.1844	0.1879
0.5	0.1915	0.1950	0.1985	0.2019	0.2054	0.2088	0.2123	0.2157	0.2190	0.2224
0.6	0.2258	0.2291	0.2324	0.2357	0.2389	0.2422	0.2454	0.2486	0.2518	0.2549
0.7	0.2580	0.2612	0.2642	0.2673	0.2704	0.2734	0.2764	0.2794	0.2823	0.2852
0.8	0.2881	0.2910	0.2939	0.2967	0.2996	0.3023	0.3051	0.3078	0.3106	0.3133
0.9	0.3159	0.3186	0.3212	0.3238	0.3264	0.3289	0.3315	0.3340	0.3365	0.3389
1.0	0.3413	0.3438	0 3461	0.3485	0.3508	0.3531	0.3554	0.3577	0.3599	0.3621
1.1	0.3643	0.3665	0.3686	0.3708	0.3729	0.3749	0.3770	0.3790	0.3810	0.3830
1.2	0.3849	0.3869	0.3888	0.3907	0.3925	0.3944	0.3962	0.3980	0.3997	0.4015
1.3	0.4032	0.4049	0.4066	0.4082	0.4099	0.4115	0.4131	0.4147	0.4162	0.4177
1.4	0.4192	0.4207	0.4222	0.4236	0.4251	0.4265	0.4279	0.4292	0.4306	0.4319
1.5	0.4332	0.4345	0.4357	0.4370	0.4382	0.4394	0.4406	0.4418	0.4429	0.4441
1.6	0.4452	0.4463	0.4474	0.4484	0.4495	0.4505	0.4515	0.4525	0.4535	0.4545
1.7	0.4554	0.4564	0.4573	0.4582	0.4591	0.4599	0.4608	0.4616	0.4625	0.4633
1.8	0.4641	0.4649	0.4656	0.4664	0.4671	0.4678	0.4686	0.4693	0.4699	0.4706
1.9	0.4713	0.4719	0.4726	0.4732	0.4738	0.4744	0.4750	0.4756	0.4761	0.4767
2.0	0.4772	0.4778	0.4783	0.4788	0.4793	0.4798	0.4803	0.4808	0.4812	0.4817
2.1	0.4821	0.4826	0.4830	0.4834	0.4838	0.4842	0.4846	0.4850	0.4854	0.4857
2.2	0.4861	0.4864	0.4868	0.4871	0.4875	0.4878	0.4881	0.4884	0.4887	0.4890
2.3	0.4893	0.4896	0.4898	0.4901	0.4904	0.4906	0.4909	0.4911	0.4913	0.4916
2.4	0.4918	0.4920	0.4922	0.4925	0.4927	0.4929	0.4931	0.4932	0.4934	0.4936
2.5	0.4938	0.4940	0.4941	0.4943	0.4945	0.4946	0.4948	0.4949	0.4951	0.4952
2.6	0.4953	0.4955	0.4956	0.4957	0.4959	0.4960	0.4961	0.4962	0.4963	0.4964
2.7	0.4965	0.4966	0.4967	0.4968	0.4969	0.4970	0.4971	0.4972	0.4973	0.4974
2.8	0.4974	0.4975	0.4976	0.4977	0.4977	0.4978	0.4979	0.4979	0.4980	0.4981
2.9	0.4981	0.4982	0.4982	0.4983	0.4984	0.4984	0.4985	0.4985	0.4986	0.4986
3.0	0.4987	0.4987	0.4987	0.4988	0.4988	0.4989	0.4989	0.4989	0.4990	0.4990
3.1	0.4990	0.4991	0.4991	0.4991	0.4992	0.4992	0.4992	0.4992	0.4993	0.4993
3.2	0.4993	0.4993	0.4994	0.4994	0.4994	0.4994	0.4994	0.4995	0.4995	0.4995
3.3	0.4995	0.4995	0.4995	0.4996	0.4996	0.4996	0.4996	0.4996	0.4996	0.4997
3.4	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4997	0.4998
3.5	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998	0.4998
3.6	0.4998	0.4998	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999
3.7	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999
3.8	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999	0.4999
3.9	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000	0.5000

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